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Optimal Agricultural Practices for Growing Kenaf in Iowa

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Abstract:

The demand for natural fibers is increasing worldwide due to a growing interest in using renewable sources in place of those derived from petrochemicals. Kenaf (*Hibiscus cannabinus* L.) is a promising biorenewable resource for natural fibers that has rarely been grown in the Midwest. Literature is abundant about effects of management practices on kenaf productivity and fiber yield, but few studies have evaluated their interactions. The objectives of this study were to: 1) determine management practices leading to optimal kenaf and fiber yield; 2) evaluate stem height, basal diameter, and leaf area index (LAI) over the growing season; and 3) assess the influence of the management practices on fiber (bast, core) composition, and C, N, and ash quantity. Cultivars 'Tainung 2' and 'Whitten' were planted at 247,000 and 371,000 seed ha^{-1}, in 38-cm and 76-cm rows, received 0, 56, 112, 168, or 224 kg ha^{-1} N in Central Iowa in 2014 and 2015. Stem DM yield, core and bast ratio, lignocellulose concentration, total ash, and carbon and nitrogen ratio were determined at the harvest, and stem height, basal diameter, and LAI were measured during the growing season of each year. The most striking result was that N fertilization did not increase stem DM yield, regardless to how much N was applied. However, we found that N effects were often observed for cell wall composition and ash concentration, and that the implications of these observations were directly related to kenaf end-use products. Moreover, we demonstrated that Tainung 2 and Whitten respond differently, depending on the management practices used. Overall, this study brought new evidence that kenaf could be successfully grown in Iowa, and that it is a promising multi-purpose crop for the region.

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